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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/533,315	04/29/2005	Hans Wohlfromm	12810-00081-US	4633
30678 7590 12/11/2007 CONNOLLY BOVE LODGE & HUTZ LLP 1875 EYE STREET, N.W. SUITE 1100 WASHINGTON, DC 20036			EXAMINER KESSLER, CHRISTOPHER S	
			ART UNIT 1793	PAPER NUMBER
			MAIL DATE 12/11/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/533,315	<b>Applicant(s)</b> WOHLFROMM ET AL.	
	<b>Examiner</b> Christopher Kessler	<b>Art Unit</b> 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 29 April 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) 6 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 5/25/05, 2/7/06
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Election/Restrictions*

1. Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claim(s) 1-5, drawn to a metal injection molding material.

Group II, claim(s) 6, drawn to a metal injection molding process.

The inventions listed as Groups I and II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: Claims 1-5 and/or claim 6 are found to lack inventive step over the prior art as detailed below.

During a telephone conversation with Matt Mason on 25 June 2007 a provisional election was made with traverse to prosecute the invention of group I, claims 1-5.

Affirmation of this election must be made by applicant in replying to this Office action.

Claim 6 is withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

***Priority***

2. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. PCT/EP/03/11624.

***Examiner's Interpretation***

3. Claim 1 recites the limitation "at least 90% by weight, based on the amount of this iron-containing powder, of the particles of which have an effective diameter of at least 40 micrometers." In the specification at page 4, applicant has stated

All that is decisive for the present invention is that at least 50% by weight of the metal powder present in the powder injection molding material comprise an iron-containing powder, once again at least 90% by weight, based on the amount of this iron-containing powder, of the particles of which have an effective diameter of at least 40 micrometers. In other words, the metal powder in the novel metal injection molding material contains at least 50% by weight of an iron-containing powder having a particle size, expressed as the d90 value, of at least 40 micrometers.

Thus, said limitation is interpreted to mean that at least 50% of the iron powder has an effective d<sub>90</sub> size of at least 40 µm.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1, 2, 4 and 5 are rejected under 35 U.S.C. 103(a) as being obvious over U.S. Patent Document US 2003/0091456 issued to Bloemacher et al. (hereinafter "Bloemacher").

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and

reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(I)(1) and § 706.02(I)(2).

Regarding claim 1, Bloemacher teaches the invention substantially as claimed. Bloemacher teaches an injection molding compound comprising 56.5% by volume of a mixture of 92 wt% iron powder and 8 wt% nickel powder (see Example). Bloemacher teaches that the mixture comprises 37.3% by volume of polyoxymethylene, meeting the limitation of a thermoplastic binder (see Example). Bloemacher does not teach what the particle size of the iron powder is. Bloemacher does not teach a  $d_{90}$  value for the powder, however Bloemacher teaches that the particle size of the powders is typically 0.1-50  $\mu\text{m}$ , said range overlapping the range as claimed and establishing a prima facie case of obviousness for that range. It would have been obvious to one of ordinary skill in the art at time of invention to have selected a particle size of greater than 40  $\mu\text{m}$  because Bloemacher teaches the same utility over an overlapping range. Applicant is further directed to MPEP 2144.05. Bloemacher teaches that the iron powder is carbonyl iron (see Example), meeting the limitation wherein the total amount of metal powder contained comprises at least 90% by weight of iron.

Regarding claim 2, Bloemacher teaches that the particle size of the powders is typically 0.1-50  $\mu\text{m}$ , said range overlapping the range as claimed and establishing a prima facie case of obviousness for that range. It would have been obvious to one of

ordinary skill in the art at time of invention to have selected a particle size of 50  $\mu\text{m}$  because Bloemacher teaches the same utility over an overlapping range. Applicant is further directed to MPEP 2144.05.

Regarding claim 4, Bloemacher teaches that the iron powder is carbonyl iron (see Example), meeting the limitation wherein the total amount of metal powder contained comprises at least 90% by weight of iron.

Regarding claim 5, Bloemacher teaches that the mixture further comprises 6.2% by volume of polyolefin (see Example), meeting the limitation of wherein the thermoplastic binder consists of a mixture of from 50 to 100% by weight of a polyoxymethylene homo- or copolymer and from 0 to 50% by weight of a polymer which is immiscible with the polyoxymethylene homo- or copolymer and can be removed thermally without a residue.

6. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over S.K. Roy et al, "Metal Injection Molding of Coarse Iron Powders," PMI, vol. 24, no. 2, 1992, pp. 88-90 (hereinafter "Roy").

Roy teaches the invention substantially as claimed. Roy teaches an injection molding material that comprises a powder having 98% iron content (see Experimental Procedures). Roy teaches that it is known to optimize the particle size distribution of iron powder in injection molding feedstock in order to get favorable compact density (see Introduction). Thus, particle size of the feedstock is a results-effective variable with

regard to compact density, and would have been optimized by one of ordinary skill in the art through routine experimentation. Applicant is further directed to MPEP 2144.05.

Roy teaches to use a powder with aspect ratio of ~4, and particle size of 150 x 75  $\mu\text{m}$  (see Experimental Procedure, Table 1). Thus, the powder of Roy would be understood by one of ordinary skill in the art to have an effective  $d_{90}$  value greater than 60  $\mu\text{m}$  because it was sieved to -100/+200 (i. e., particles fell through a 150  $\mu\text{m}$  opening but did not fall through a 75  $\mu\text{m}$  opening upon sieving – see Table 1). Roy teaches the addition of a thermoplastic binder (see Experimental Procedures). Roy teaches that the iron powder and binder are mixed in proportions of 40 and 60 volume % solids (see Experimental Procedures, Results and Discussion, Figs. 2 & 3, and Powder Loading, for example), said amounts falling within the ranges of iron powder and binder as claimed and anticipating the ranges as claimed. Applicant is further directed to MPEP 2131.03.

The examiner further notes that the presence of a dispersant and/or optionally also other assistants is not required by the instant claims.

7. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bloemacher in view of S.K. Roy et al, "Metal Injection Molding of Coarse Iron Powders," PMI, vol. 24, no. 2, 1992, pp. 88-90 (hereinafter "Roy").

Regarding claim 3, Bloemacher teaches the invention substantially as claimed. Bloemacher teaches an injection molding compound comprising 56.5% by volume of a mixture of 92 wt% iron powder and 8 wt% nickel powder (see Example). Bloemacher



teaches that the mixture comprises 37.3% by volume of polyoxymethylene, meeting the limitation of a thermoplastic binder (see Example). Bloemacher does not teach what the particle size of the iron powder is. Bloemacher teaches that the particle size of the powders is typically 0.1-50  $\mu\text{m}$ , but does not teach or suggest use of a coarse powder with  $d_{90}$  size of greater than 60  $\mu\text{m}$ .

However, the particle size of powder used for injection molding feedstock is well known in the art to be a results effective variable with regard to flowability, viscosity, and sintering parameters. For example, Roy teaches that it is known to optimize the particle size distribution of iron powder in injection molding feedstock in order to get favorable compact density (see Introduction). Thus, particle size of the feedstock is a results-effective variable with regard to compact density, and would have been optimized by one of ordinary skill in the art through routine experimentation. Applicant is further directed to MPEP 2144.05.

Further, Roy teaches an example using iron powders meeting the limitations of the instant claims in injection molding feedstock. Roy teaches to use a powder with aspect ratio of  $\sim 4$ , and particle size of 150 x 75  $\mu\text{m}$  (see Experimental Procedure, Table 1). Thus, the powder of Roy would be understood by one of ordinary skill in the art to have  $d_{90}$  value greater than 60  $\mu\text{m}$  because it was sieved to +200 (i. e., particles did not fall through a 75  $\mu\text{m}$  opening upon sieving – see Table 1). It would have been obvious to one of ordinary skill in the art at time of invention to have altered the invention of Bloemacher by using the high aspect ratio powder of Roy in order to avoid the effects resulting from large surface area, as taught by Roy (see Introduction).

***Conclusion***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher Kessler whose telephone number is (571) 272-6510. The examiner can normally be reached on Mon-Fri, 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

csk

  
**ROY KING**  
**SUPERVISORY PATENT EXAMINER**  
**TECHNOLOGY CENTER 1700**